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# A Note on Keenan's (1971) Paper on Presupposition and its Relationship to Epistemic Modality\*

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Keenan (1971) における前提と認識的モダリティの関係について

坂口 真理

本稿では、Keenan (1971) で論じられた前提と断定という語用論的な概念が、認識的モダリティの主観性を説明する際に重要な役割を果たすことを示す。そして、認識論理学における可能世界の概念がモダリティの分析に光をあてると主張する。

第 1 節で、前提と断定の概念を定義し、第 2 節で、主観的モダル表現の統語的性質を論じる。主観的モダリティを含む表現は、疑問、文代名詞化、否定、時制の作用域に入ることができないことを示す。第 3 節で、可能世界と認識論理学について考察し、第 4 節で、今後の課題を述べる。

キーワード：認識的モダリティ，主観性，前提，可能世界

## 0. Introduction

In this paper, it will be shown that the pragmatic notions of presupposition and assertion play an important role in accounting for the subjectivity of epistemic modality and that notions in epistemic logic and in possible world semantics shed light on the analysis of modality. Lastly, the possible objections to this approach will be examined and the possibility of formalizing our linguistic intuitions will be explored.

Here the present analysis is restricted to epistemic modals which express possibility and necessities as in the following sentences.

- (1) It may be raining in Chicago. – Karttunen (1971).
- (2) Possibly the gazebo was built by Sir Christopher Wren.  
– Halliday (1970)
- (3) It is possible that John is bald.
- (4) I must have loved Audrey all the time.  
– A. Christie, *Towards Zero (TZ)* p.25

Key Words: epistemic modality, subjectivity, presupposition, possible worlds

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I will not discuss deontic modals which express permissions and obligations as in the following sentences:

(5) I must be making my way homewards. – TZ p.4

(6) May I conclude that you like him?

–E.M. Forster, *Where Angels Fear to Tread* p.36

Section 1 introduces the definition of assertion and presupposition. Section 2 discusses syntactic characteristics of subjective modality. It will be shown that subjective modal expressions cannot be in the scope of question, sentence pronominalization, negation and tense. Section 3 discusses possible worlds<sup>1</sup> and epistemic logic. Lastly, residual problems are discussed in Section 4.

## 1. Assertion and Presupposition

Definitions of presupposition differ among approaches. According to Keenan (1971), there are two main definitions of presuppositions: logical and pragmatic. Logical presuppositions are defined ultimately on the relation between base structures and the world, whereas pragmatic presuppositions are defined on the relation between utterances and their contexts. In this paper, I will tentatively adopt the pragmatic definition of presuppositions. An assertion is taken to be a notion that contrasts with presupposition. For instance, in (7) which is considered to be an answer to the question, “Who killed Cock Robin ?”, the presupposition is (7a) and the assertion is (7b).

(7) JOHN killed Cock Robin.

(7a)  $\lambda x$  (x killed Cock Robin) is {well-defined/ under discussion}.

(7b)  $\text{JOHN} \in \lambda x$  (x killed Cock Robin)

(cf. Ota (1980), Jackendoff (1972:Chapter 6))

In (7a) a lambda-operator  $\lambda$  is used instead of an existential operator  $\exists$  since the value of  $x$  can be zero, i.e. the truth value is false, such as in the case of *no one*.) Jackendoff (1972:230) calls JOHN in (7) “focus of a sentence” which denotes the information in the sentence that is assumed by the speaker but is not shared by the speaker and the hearer. A “presupposition of a sentence” is defined as denoting the information that is assumed by the speaker to be shared by the speaker and the hearer. Thus my definition of presupposition is based on context-dependent informational structure. Explanatory adequacy of my approach will be discussed in the last section, comparing it with a logical (not pragmatic) approach. Presuppositions and assertions are determined in the domain of discourse grammar rather than sentence grammar. The domain of discourse grammar roughly corresponds to Halliday’s notion of ‘textual function’, which distinguishes old information from new information.

## 2. Syntactic characteristics of Subjective epistemic modality

The idea that subjective modality forms a continuous scale rather than discrete notions has been supported by many linguists (cf. Halliday (1970), Horn (1972), Lyons (1977), Teramura (1979)). I will not, however, concern myself here with the problem of whether epistemic modality is divided by discrete notions of subjectivity vs. objectivity or it is a continuum with gradation. Nor am I going to fit subjective epistemic modality and objective epistemic modality into a theoretical model like a tripartite utterance in Lyons (1977).

Compared with expressions like *it is possible that* and *it is certain that*, expressions such as *I think, may, must, certainly* can be regarded as expressing more subjective aspects of subjective epistemic modality. I will point out that these more subjective expressions (e.g. *I think, may, must, certainly*, etc.) exhibit syntactic behaviors different from objective expressions (e.g. *it is possible that, it is certain that*, etc.) with respect to question, pronominalization, negation, and tense in discourse. I will account for their properties using the notions presuppositions and assertions, and notions in epistemic logic.

First, let us consider the difference between the following expressions (8) and (9). (8), where the first person subject is used, is more subjective than (9), where the third person subject is used.

(8) I think the Giants will win the pennant next year.

(9) Mary thinks the Giants will win the pennant next year.

The difference between these two utterances emerges when their syntactic behaviors are examined with respect to question, pronominalization, negation, and tense.

To begin with, let us examine whether subjective modality can be the focus of question, i.e. the element that is questioned. (8) above cannot be made into a tag question. # indicates a pragmatically unacceptable utterance.<sup>2</sup>

(8a) # I think the Giants will win the pennant next year, don't I?

(8b) I think the Giants will win the pennant next year, won't they?

(cf. Hooper(1975))

(9a) Mary thinks the Giants will win the pennant next year, doesn't she?

Moreover, (8) cannot be formed into a question as in (10), but (9) can be as in (11):

(10) #Do I think the Giants will win the pennant next year?

(11) Does she think the Giants will win the pennant next year?

(10) and (11) can be rendered acceptable only in a very special context where the

speaker is asking herself whether she is really thinking (excepting echo-questions, of course). Thus, subjective epistemic modality cannot be the focus of question, i.e. cannot be questioned. In the utterance (8), the embedded sentence constitutes the assertion and  $\lambda x (I \text{ think } x)$  can be regarded as presupposition:

- (8c) presupposition :  $\lambda x (I \text{ think } x)$  is {well-defined/ under discussion}.  
 assertion : the Giants will win the pennant next year  $\in \lambda x (I \text{ think } x)$

On the other hand, in utterance (9), the whole matrix sentence including *Mary thinks* can be asserted.

- (9b) presupposition :  $\lambda x (x \text{ happens})$  is {well-defined/ under discussion}.  
 assertion : Mary thinks the Giants will win the pennant next year  $\in \lambda x (x \text{ happens})$

Unacceptability of (8a) and (10) is accounted for if we assume that presupposition cannot be questioned. Assertions, on the other hand, can be questioned, hence (8b), (9a) and (11) are acceptable. Questions (8a) and (10) ask whether  $\lambda x (I \text{ think } x)$  is under discussion, i.e. *#Is  $\lambda x (I \text{ think } x)$  under discussion?*, which contradicts with the definition of presupposition. Why then do assertions in (8) and (9) take different scopes as in (8) the embedded sentence in (9) the matrix sentence? This question is considered later with respect to the grammatical person of the main clause subject and epistemic logic.

Secondly, let us look at subject epistemic modality in terms of sentence pronominalization.

Expressions like (8) cannot be inside the scope of *so*, but (9) can:

- (12) A: I think the Giants will win the pennant next year.  
 B: I don't think so. I think the Tigers will.

In (12), the scope of *so* is in the embedded sentence, *the Giants will win the pennant next year*, which is the assertion of A's utterance.

- (13) A: Mary thinks the Giants will win the pennant next year.  
 B: If so, she is too optimistic. I am afraid they won't.

In (13), the scope of *so* is A's assertion, the entire matrix sentence *Mary thinks the Giants will win the pennant next year*. The sentence pro-form *so* can be regarded as taking only the assertion but not the presupposition of the utterance as its scope. We can clearly see that the subjective epistemic modality as in (8) does not fall within the scope of sentence pronominalization.

Thirdly, let us examine subjective epistemic modality in relation to negation. The presuppositional part  $\lambda x(I \text{ think } x)$  in (8) cannot be negated. As in (14), it sounds really strange to negate the utterance (8). Note that in contrast to the anomalousness of negating the whole utterance, the negation of the assertion of (8) is perfectly acceptable. On the other hand, as in (15), we can negate the whole utterance since the subject of the main clause is not the first person.

(14) A: I think the Giants will win the pennant next year.

B: #No, you don't. (cf. I don't think so.)

(15) A: Mary thinks the Giants will win the pennant next year.

B: No, she doesn't.

We have seen that subject epistemic modality of the "*I think*" type is outside the scope of negation. Here are other examples of this type.

(16) a. Certainly she is not a beauty.

b. She may not be happy.

c. She must not be happy.

Lastly, we will consider the relation between subjective modality and tense. Halliday (1970) observed that sentence (17) which expresses objective modality cannot be replaced by expressions of subjective modality such as (18) and (19).

(17) It was certain that this gazebo had been built by Wren until the discovery of the title-deeds.

(18) #This gazebo must have been built by Wren until the discovery of the title-deeds.

(19) #Certainly this gazebo had been built by Wren until the discovery of the title-deeds.

In (17), the period when people were certain is specified in terms of the *until*-clause. (17) implies that it is not certain anymore. The past tensed *was* in (17) indicates the certainty is in the past. The truth value of *it is certain that p* is ensured until the discovery of the title-deeds. Both (18) and (19) express the speaker's present conviction of the past event, hence subjective modality cannot co-occur with the *until*-clause. Thus, generally, subjective modality cannot co-occur with adverbial clauses which indicate the time other than the time of speaker's utterance. Clearly there is a difference in subjectivity between the present form *I think* and the past tensed *I thought*.

(20) I thought you liked her until I realized that you actually hate her.

(21) #I think this gazebo was built by Wren until the discovery of the title-deeds.

The expression, *I thought* in (20), allows the speaker to revise his opinion. We have seen that subjective modality does not take its scope inside the past tense.

In this section, it was shown that utterances expressing subjective modality cannot be the focus of question, pronominalization, negation, and tense.

### 3. Possible worlds and Epistemic Logic

In the previous section, we have seen that modal expressions containing the first person singular present differ from those containing the third person or past tense in that the former cannot be questioned or negated. This was due to their difference in the scope of assertions. In this section, let me clarify the reason why this scope difference in assertions arises in terms of possible worlds and epistemic logic.

A clear definition of possible worlds requires further investigation, but here I will follow the system of Hintikka (1962, 1969)<sup>3</sup>.

- (22) a. Any model set  $W$  that contains some atomic formula  $p$  does not contain its negation: i.e. if  $p \in W$  then  $\sim p \notin W$   
 b. There is some other model set  $W^*$ , that is an alternative to  $W$ , and contains the formula  $\sim p : \sim p \in W^*$   
 (Karttunen (1971), Uchida (1978))

With regard to the notion of possible worlds, epistemic modality can be defined in terms of speaker's knowledge. It is epistemically impossible to know what the beliefs of others are. The speaker and the others, or the speaker in the present and the speaker in the past are considered to belong to distinct possible worlds. This is why we can question whether others *have* the belief before questioning what their belief is.

- (23) "Audrey thinks it would be quite a good thing."  
 "Audrey – what do you mean, Audrey thinks? How do you know what Audrey thinks?" – *TZ*, p.23

The speaker cannot assert the proposition which is contradictory to what she or he knows as in (24a) since her or his assertion and her or his knowledge seems to belong to the same possible world. On the other hand, (24b) where the speaker's assertion and Fred's belief are contradictory is well-formed since they belong to distinct possible worlds.

- (24) a. #The cat is on the mat, but I don't know whether the cat is on the mat.  
 –Karttunen (1971)

- b. The cat is on the mat, but Fred does not believe it.

As we will see in (25a) and (25c) below the speaker cannot assert the fact that she or he knows with no qualifications or using factive predicates, in conjunction with what she or he epistemically believes to be otherwise:

- (25) a. # It isn't raining in Chicago, but it may be raining there.  
           –Karttunen (1971) (no qualifications)  
       b. {I think/ I believe} it isn't raining in Chicago, but it may be raining there. –  
           ibid.  
       c. # {I know/I admit} it isn't raining in Chicago, but it may be raining there.  
           (factive predicate)

The first conjuncts of (25a) and (25c) constitute the speaker's assertion of the fact or asserts that she/he knows the fact, whereas the first conjunct of (25b) merely indicates that the speaker has certain belief. Holding belief differs from having knowledge in the degree of commitment to the truth-value of the proposition. This may be the reason why (25a,c) and (25b) differ in acceptability.

Expressions containing two subjective epistemic modal expressions like (25b) which has *I think/I believe* and *may* form two kinds of possible worlds. For instance, in the case of (25b) the world in which 'it is raining' is true and the world in which 'it is not raining' is true. The speaker is committed to two alternative beliefs or two alternative possible worlds.

Two alternative possible worlds are expressed also in the following sentences:

- (26) Maybe John used to drink coffee, but has now stopped doing so.  
 (27) Perhaps John has no children, but perhaps his children are away on vacation.  
       – Liberman (1973)  
 (28) I think you'd better leave, or I'm afraid there'll be trouble. – ibid.  
 (29) The man may be a duke or he may be an organ-grinder. – WA,p.31.

In this section, it was shown that the scopal difference between subjective modal expressions and objective expressions arise because the former in principle cannot have two alternative possible worlds.

#### 4. Residual Problems

Lastly, let us compare our pragmatic approach of presuppositions and possible worlds with more formal approach in Ben-Chorin (1982), which is in the general boolean algebraic framework of Keenan & Faltz (1978). In Ben-Chorin (1982), propositions are defined as properties of possible worlds.



The characteristics of Sentential Complement denotations are as follows:

- 1) All of them have the unit property, which is taken to be the denotation of proposition.
- 2) They are maximally consistent sets, i.e.  $\forall p \in P$ , exactly one of either  $p$  or  $p'$  can be in any individual.

As we have seen in (22a) our approach also defines possible worlds as maximally consistent sets.

It seems that our approach can be incorporated into a formal framework, except that presuppositions logically defined may be too strong.

There are some claims that presuppositions are belief-independent (Keenan (1971)). Although I mentioned the connection between belief and presuppositions, I did not explicitly formalize their relations here. All these problems will be open to future investigation.

### Notes

\*This paper is based on the term paper written around 1982-1983 for the Semantics class taught by Prof. Ed Keenan at UCLA. Many years have passed since then. I kept the original claims of the paper. It should be noted that this paper was before Mats Rooth (1985) and the recent development of Generalized Quantifier Theory and semantic theories in general mentioned in Portner (2009). I did not incorporate the findings thereafter in this paper.

<sup>1</sup> The notion of “possible worlds” was first introduced by Leibniz (1952). This notion plays an important role in modern logic and semantics. For instance, our universe (the “actual world”) is a possible world. But we can imagine other possible worlds which are like our world except there is a minor change in some detail. There is a possible world in which it is raining, and there is another possible world in which it is not.

<sup>2</sup> A reviewer points out that (8a) is acceptable in a context where the speaker said before “I think Giants will win the pennant next year”, and later again confirm his utterance which he had conveyed previously. Here such “echo-question” contexts are excluded from consideration in (8a) and (10).

<sup>3</sup> See Moori (1980) for an informal but insightful explanation of possible worlds.

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